

OPERATIONS IMPROVEMENT APPROACHES AND CUSTOMER SATISFACTION IN KENYA POWER & LIGHTING COMPANY

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DOI: <https://doi.org/10.5281/zenodo.10512943>

Published Date: 15-January-2024

Abstract: Operations management is essential for achieving greater speed, quality, and cost effectiveness. The implementation of lean systems can help achieve these aspects of customer satisfaction. Performance at every level will rise as a result of operations transformation. Lean management, six Sigma, total quality management, Kaizen, and automation are all examples of tools for improving operations. This study was founded on two objectives; to find out the extent of implementation of operations improvement approaches at Kenya Power & Lighting Company (KPLC), to determine the effect of these operations improvement approaches on customer satisfaction. The study adopted a quantitative descriptive survey approach. The study targeted respondents from KPLC as well as its customers. A total of 385 respondents were randomly selected to participate in the study from both KPLC Staff and its customers where 290 respondents shared back their feedback. Data was collected using a Google form survey questionnaire which contained close ended questions. Data was analysed using descriptive and inferential statistics and presented in accordance with the objectives of the study. Regression analysis was adopted to determine the relationship between operations improvement approaches variables and customer satisfaction variables. This objective established that Total Quality Management, Lean Management, Kaizen, Automation and Six-Sigma all had a positive relationship with customer satisfaction in Kenya Power and Lighting Company (KPLC). Results of regression analysis revealed that 67.4% of the variance in Customer Satisfaction was explained by the variation in the independent variables. Results of F-test indicated an F value at degree of freedom (5, 284) of 17.755 which was significant as it was greater than the critical value of 2.21. The study was limited first by the objectives which focused on five key operational improvement approaches leaving other variables. The study was also constrained by the fact that focus was on one county with different levels of power connectivity, economic levels as well as service levels which may make it difficult to map the findings to the other 46 counties. The study recommends that policy makers and formulators of strategies need to take advantage of the opportunities provided by operations improvement approaches to enhance organizational service delivery. Furthermore, while implementing strategy, policy makers should ensure open communication so that all stakeholders are aware of strategies and policies being implemented. Further studies should focus on operations improvement approaches and customer satisfaction of either all parastatals in Kenya, multinational companies or private service providers.

Keywords: Operations Improvement Approaches, Customer Satisfaction, Kenya Power & Lighting Company, Total quality management, Lean management, Kaizen, Automation and Six sigma.

1. BACKGROUND OF THE STUDY

Customers are more likely to stay with the firm and be satisfied with the service. Nevertheless, this is one of the threats to the service sector. Operations improvement approaches enhance the levels of efficiency, standards of processes and get rid of any barriers on achieving quality objectives in various companies (Izquierdo, 2022). Globalization, competition, and regulations are the main factors that have improved industry operations (Izquierdo, 2022). According to Kumar and

Suresh (2016), operations is the division of an organization that deals with the conversion of data into high-quality outcomes. According to Izquierdo (2022), costs and the provision of services are impacted by operational performance, and a positive customer experience can increase service satisfaction and customer loyalty. The firms offering services have increased in the country and this calls for implementation of operations improvement approaches in the industry. As a result, firms excel and customers get satisfied. Arora (2008) argues that customers need to learn about improvements in the company for them to have a different opinion concerning the service or product being offered.

The study was anchored on systems theory and consumer theory. Marketing and management are two examples of areas that are included in system theory. A system, for instance, might be a plan for looking at how an organization interacts with its environment (Mele, Pels and Pelese, 2010). Systems theory involves adaptation, goal attainment, pattern maintenance and integration which are necessary to maintain systems existence and effectiveness, as well as the systems goal of seeking equilibrium (Huilai and Huilin, 2017). Kenya Power distributes and retail electricity across the country and has automated some parts of its network through supervisory control and data acquisition system to monitor network operations, which gives a good customer service to the customers (KPLC, 2022). Consumer theory, according to Brodbeck and Frey (2019) illustrates a positive relationship and does not have any effects on satisfaction although it has many predictions that compete with each other. Satisfaction or dissatisfaction about a service or a product are as a result of the performance or expectations. According to Churchill & Surprenant (1982); Oliver (2010) customer satisfaction and disconfirmation theory predict a positive relationship. Over fulfillment of expectations is due to positive disconfirmation and thus increased satisfaction levels. On the other hand, Oliver (2010) asserts that when the performance expectation of a product or service is met, it is confirmed; otherwise, failure to meet it causes negative disconfirmation.

Despite this, KPLC has continued to struggle with various challenges regarding operational improvement approaches on customer satisfaction. The challenges are driven by failure to recruit and replace staff exiting the organization, a gap affecting customers' expectations on quick response time during power outages (Sinei, 2013). Strained financial resources and unavailability of tools and materials has further complicated the operations at the organization leading to frequent disruption due to unstable network. Unreasonably high and estimated bills has hampered quality services and satisfying customer's needs. Based on the circumstances described above, the purpose of the study is to determine the extent of implementation of operations improvement strategies and their impact on customer satisfaction at Kenya Power and Lighting Company.

1.1 Problem Statement

Any organization's performance can be enhanced through operations improvement strategies. Lack of implementation of the approaches will negatively affect the position of companies in a global world. Because of the dynamic nature of KPLC and the environment, operations improvement strategies must be implemented KPLC Annual Report (2021). It's implementation has a higher positive impact on the firm's operational performance factors such as improvement of quality, responsiveness, speed, reduction of cost, productivity, sustainability, service recovery, proficiency, effectivity as well as sustainability (Gadwe & Sangode, 2019). Seven hundred Large Power customers and 67,000 SMEs within the company now use smart meters more frequently as a result of the establishment of data control centers. This move has registered 8% growth in sales from the 67,000 SME accounts, while debt age has reduced from 34.58 days to 27.87 days. KPLC further installed an additional 75,000 smart meters for SME accounts in the Financial Year 2021/22 KPLC (2022). Despite these project ventures which KPLC has undertaken, customers have continued to complain of poor services ranging from high electricity bills and unstable supply due to long periods of power disruptions during their usage. This has impacted negatively on the customers. Sirma (2011) undertook a study of approaches used by SMEs in Nairobi, Kenya to improve business operations. However, this study failed to examine the business process improvement approaches and customer satisfaction in other jurisdiction. Muriithi (2014) studied the performance of commercial banks in Kenya and continuous improvement brought about by methods of operations. However, this study did not bring out the relationship between implementation of operations improvement approaches and customer satisfaction. Tarus (2018) undertook a study on performance and strategies that improve quality of services in public institutions. However, the study failed to address operations improvement approaches on customer satisfaction in KPLC. Muchira (2018) did a case study about the effect of total quality management on customer satisfaction confined to the educational institution in Nairobi. This study failed to address companies listed in Nairobi Security Exchange like KPLC. Studies that were undertaken did not address how operations improvement approaches affect customer satisfaction in KPLC. Therefore, the study would fill the gap by determining the effect of operations improvement approaches on customer satisfaction at KPLC. It would answer the question: What is the effect of implementations of improvement approaches on customer satisfaction at Kenya Power and Lighting Company?

1.2 Research Objectives

- i. To find out the extent of implementation of operations improvement approaches at Kenya Power & Lighting Company
- ii. To determine the effect of operations improvement approaches on customer satisfaction at KPLC.

1.3 Theoretical Literature Review

Systems theory which was propounded by Bertalanffy (1969), is the main theory in this study. It was relevant to this research since in utility firms; there is interaction with the external environment as they are seeking ways of growing business networks. This proves the dependence between departments in internal environment and even the external environment (Lysons & Farrington, 2006). In addition, Consumer theory, which focuses on how consumers make consumption decisions, was also deemed important to the study.

1.3.1 Systems Theory

Ludwig Von Bertalanffy (1969) propounded systems theory and it indicates that systems are those components of the organization, which are dependent on one another. Moreover, they have close relationship, which helps the organization to attain performance objectives (Cristina, Jacqueline & Francesco, 2010). Systems theory is founded on two assumptions (Beer, 1972). Since the groups establish the procedures and the intended results, resources and procedures are given to the groups in order to attain the desired result Cristina, Jacqueline, & Francesco (2010). The inputs for the organization are obtained from the external environment before they are transformed into output and taken back to the outside world for consumption Katz & Kahn (1966). Systems theory is relevant to this study as it offers a thorough framework for examining and enhancing organizational operations. The subsystems of the company transform and adjust often due to disruptions from the environment. It is prudent to note that the firm gets inputs from the environment and then transforms them into output before sending them back to the environment. Some output will be input in other areas and vice versa (Beer, 1972). The theory of coordination, developed by Malone (1988) explains how projects relate to one another.

1.3.2 Consumer Theory

Consumer theory is the study of how people make choices (Varian, 1999). Consumer theory is essential for predicting how changes in income or prices will impact consumption patterns, assessing consumer behavior, and guiding policy choices pertaining to consumer welfare. It also provides a framework for understanding market demand. The performance or expectations of a service or product determine satisfaction or dissatisfaction Brodbeck and Frey (2019). According to Churchill & Surprenant (1982); Oliver (2010) customer satisfaction and disconfirmation theory predict a positive relationship between customer satisfaction and the perception of the actual service received. Positive confirmation and consequently, higher levels of satisfaction are the results of over-fulfillment of expectations. On the other hand, (Oliver, 2010) declares that a product or service is confirmed when the performance expectation is met; failure to meet it results in negative disconfirmation. Consumer theory is relevant to the study since electricity prices do fluctuate as tariffs change. It explains demand curves, market behavior, and how price fluctuations affect consumer decisions. It assists in forecasting how shifts in income and prices will affect consumer demand and, ultimately, the state of the electricity market. Consumer theory overlooks operations improvement approaches in a dynamic environment and it might not account for the dynamic nature of operational decision making in this study Panitapu and Dr. Meena Kumari (2013)

1.3.3 Operation Improvement Approaches

Operations improvement approaches refer to the procedures that are employed to improve the overall performance, efficacy, and efficiency of operational processes in businesses. To improve their lives after the war, a group of engineers and scientists in Japan used total quality management (Powell, 1995). Processes can improve quality, speed, and reduce costs (Stevenson & Hojati, 2007). The primary focus is on finding flaws in a product or process and figuring out how to fix them during the process's activities (Daniel and Gabrielle, 2008). Mandu (2011) states clearly that organizations need to prevent problems instead of detecting them since the business has functions that cannot do without the quality component. The study adopted total quality management, lean management, automation, six sigma and kaizen approaches. Each of these tools of the operations approaches are expounded on in subsequent paragraphs.

Lean management techniques can be used to reduce waste and provide customers with greater benefits (Arfmann and Federico, 2014). The ability of manufacturing practices' tools and techniques to cut costs through increased efficiency is interconnected (Kisombe, 2012). While increasing productivity, lean process improvement decreases waste. When Toyota

first began using it in the 1950s, it has since spread to many different industries and sizes of businesses. Processes that do not instantly increase product quality are eliminated by lean practices. Any system or technology that effectively removes the user's or customer's decision-making process is considered automation. Smith & Wrather (2004) assert that conventional methods face difficulties related to service and time. In business organizations, information technology has been used as part of automation to achieve efficient processes that will maximize shareholder value (Wensley and Sanchez-Polo, 2011).

Six sigma was first used by Motorola as a tool for quality improvement in 1987, and General Electric further developed it in the late 1990s. This is a problem-solving strategy that identifies the problem, organization goals and customer expectations. Based on the current operational performance of the processes it collects data and analyzes it. Six Sigma identifies root causes of defects and variations, develop, and implement solutions to the root causes identified. According to Zaheer and Choo (2003), Six sigma's principles and methodology are based on other scientific methods for reducing product and process defects. Heuvel, Jaap & Does (2006) defined Six-Sigma as a measurement of average variations in service or manufacturing processes. (Desai & Shrivastava, 2008) argue that the organization's policies, strategies for quality control, and arrangement of key performance indicators are very important.

Continuous improvement involves employees and managers, customers and suppliers in kaizen (Vinnet, 2011). Continuous improvement involves everyone in the organization in ensuring improvement of products, services and processes. Gachuhi (2012) asserts that training, job rotation and cross- functional training are necessary for the creation of firm-specific human capital. Karkoszka & Honorowicz (2009) argue that achievement of effective implementation as a result of employees' devotion creates a kaizen idea that is good. Singh & Singh (2009) explain kaizen as the umbrella term for methods like the suggestion system, maintenance, Kanban and just in time whereas Manmeet (2014) argues that achievement of effective implementation as a result of employee's devotion creates a kaizen idea that is good.

2. EMPIRICAL LITERATURE REVIEW

Reviews of the relevant studies conducted on the subject matter of this research are covered in this section. Kibe (2014) laid out the connection between tasks improvement approaches and consumer loyalty among private security firms in Nairobi area. Regression analysis, mean and standard deviation were used to analyze the objectives of the study. Findings showed a positive and significant relationship between the adopted operations improvement approaches and customer satisfaction in the private security companies in Nairobi. Ogola (2016) adopted a case study methodology and used questionnaires, stratified random, and purposeful sampling to collect and analyze data to determine the effect of bank service automation on customer satisfaction. The study investigated the effects of internet use, mobile banking, and ATM use on customer satisfaction. Mechanization of banking administrations and other objectives had a huge and positive relationship. However, the sample size was too small to generalize the results. Mugambi (2019) conducted research on the effect of operations strategies on customer satisfaction in Nairobi County, with an emphasis on automated component management. The study focused on the impact on customer satisfaction of features that reduce costs, improve quality, speed of delivery, are flexible and are innovative. Both an inferential and a descriptive research analyses were used. The study found that innovation and cost reduction features were used the least frequently, while speed of delivery and flexibility were the most common strategies. There was a strong positive correlation between operations strategies and customer satisfaction according to the study.

Ngao (2021) studied the impacts of implementation of lean manufacturing processes on operational performance measured by quality, cost and timeliness. The study's objectives were to determine the extent of implementation of lean manufacturing practices by large-scale manufacturing companies in Nairobi and to establish the effect of lean manufacturing processes on operational performance of large-scale manufacturing companies in Nairobi, Kenya. The study used descriptive research design. The analysis established that implementation of lean manufacturing techniques had a positive relationship with operational performance. In addition, the study showed that large-scale manufacturing companies face challenges of implementing these lean manufacturing processes. Some of the challenges the study highlighted include inadequate resources, resistance to change and poor organizational culture. Supriyanto, Wiyono and Burhanuddin (2021) employed a one-way analysis of variance and path analysis in the survey research design. Purposive sampling was used in the study to collect data from a particular set of respondents. Customer satisfaction, loyalty and service quality were the variables under investigation. Customer satisfaction was found to be significantly impacted by service quality. It also proved that customer loyalty was highly impacted by customer satisfaction. Customer loyalty was not significantly impacted by the quality of the services provided, though. The study suggested more research on other factors that might affect customer loyalty, like switching costs and trust.

Herman (2022) adopted random sampling method because 81 students were randomly selected for the sample. In the case study, quantitative and descriptive analysis were used to demonstrate that the level of service had a significant and beneficial effect on student satisfaction. The analysis showed that the level of service had a positive impact on student satisfaction, indicating that increased student satisfaction was due to high levels of service. The findings could be useful in enhancing services in educational institutions. Rehman, Zygiaris, Hameed & Alsubaie (2022) studied the auto care industry in Saudi Arabia to investigate the connection between service quality and customer satisfaction in the post pandemic world. The SERVQUAL framework was used in the study. The data came from one single source. According to their findings, tangibles, reliability, assurance, and responsiveness all contribute to customer satisfaction in a positive relationship. Zygiaris, Ssrocka, Zywolek and Mrowiec (2022) carried out a study to determine customer satisfaction and service quality in the energy market in Poland. The study adopted quality management tools and techniques. In addition, it used qualitative and computer-aided website interviewing (CAWI) surveys on 2404 respondents to examine customer satisfaction and service quality in Poland's energy market. The study findings showed that employees should be trained more often in the field of customer service to enhance quality service. The study recommended building an arrow diagram to increase customer satisfaction levels.

In conclusion, studies carried out were limited to specific regions in the country and did not address the operations improvement approaches indicators and customer satisfaction indicators at KPLC in Busia County, a gap this study intended to fill.

2.1 Conceptual Framework

This study is guided by the conceptual framework in figure 1.

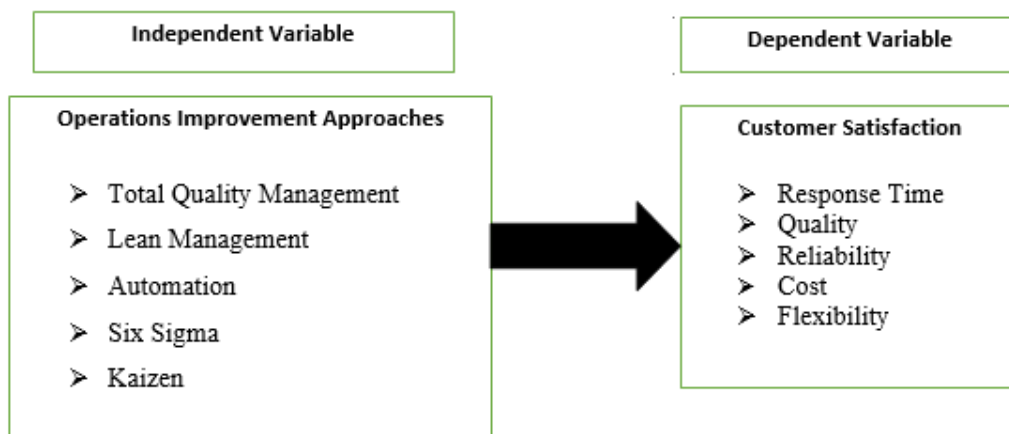


Figure 1: Operations Improvement Approaches and Customer Satisfaction

Source: Researcher (2023)

3. RESEARCH METHODOLOGY

The primary data was obtained from KPLC customers and staff identified by the researcher using a well-structured five point Likert scale questionnaire that were distributed using Google Survey forms, Email and WhatsApp. Use of questionnaires was preferred because it was less costly, convenient and allowed comparability and standardization, assuring respondent anonymity and gave fast results (Williamson, 2013). In the study, descriptive design was used. Cooper and Schindler (2006) affirm that because it involves observation and recording, the descriptive research design ensures that information about a specific population is true and accurate. A cross-sectional survey was used to collect data to reflect events at a given point in time. The information was recorded without bias in order to draw objective conclusions and make clear comparisons, necessitating statistical processing of the obtained data (Machuki & K'Obonyo, 2011). KPLC is the unit of study, while the study focused mainly on KPLC customers and staff within Busia County with 100,000 active customers (KPLC Database, 2023). This is a large population and for this reason, Cochran (1963) formula was used to determine appropriate sample size.

The value for Z is found in statistical tables which contain the area under the normal curve, example, Z = 1.96 for 95 % level of confidence. This research used Confidence Level of 95%, estimated proportion of 50%, standard Margin of error is +/-5%.

$$n_0 = (1.96)^2 * 0.5 * (1-0.5) / (0.05)^2 = 384.16$$

Rounding up gives a sample size of 385. Systematic random sampling was used since it ensures representativeness (Lohr, 2019). The questionnaire had two parts: Part one was filled by KPLC Staff while the second part was filled by KPLC Customers.

A purposive sample of staff and customers was adopted. Purposive sampling was adopted due to the relevance of the study subject's knowledge and expertise on the study. In addition to knowledge and experience, there was importance of availability and willingness to participate and the ability to communicate experiences and opinions in an articulate, expressive and reflective manner. Patton (2002) noted that sample size is purposefully selected to yield cases that are information rich and achieve breadth of understanding. KPLC staff filled section B of the questionnaire that sought to determine the level to which strategies for enhancing operations had been put into practice at KPLC while the customers answered Section C on customer satisfaction. In addition, Both KPLC customers and staff filled Section A of the questionnaire that contained general information. For ease of data analysis, the questionnaires were edited and coded and the level of accuracy and completeness checked. The first goal was to determine the extent to which KPLC had used operations improvement strategies. The following multivariate regression model was utilized in the second objective.

$$CS = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \epsilon$$

Where; β_0 is the regression constant or intercept, $\beta_1, \beta_2, \beta_3,$ and β_4 and β_5 are the unknown parameters (regression coefficients) CS= Customer Satisfaction, B0=Constant, X_1 =Total Quality Management, X_2 =Lean Management, X_3 =Automation

X_4 =Six sigma, X_5 =Kaizen ϵ = Standard error

Regression statistics R, R_2 and F was interpreted to determine the strength of the relation.

T-test was carried out to give the strength of the independent variables, whether they are significant

4. RESEARCH FINDINGS AND DISCUSSION

4.1 Operations Improvement Approaches

The first objective of the study was to find out the extent of implementation of operations improvement approaches at Kenya Power & Lighting Company (KPLC). The findings of the study on the five operations improvement objectives namely; Total Quality Management, Lean management, Automation, Six Sigma and Kaizen are also highlighted here.

4.2 Total Quality Management

Table Error! No text of specified style in document.:1 Total Quality Management

	Mean	Std. Deviation
The company is accredited by national or international bodies such International organization for standardization (ISO).	4.06	.967
Control measures are in place to track performance and to identify when processes are out of control.	4.05	1.006
There are systems that ensure failure mode effect analysis is achieved.	4.01	1.116
Overall Score	4.04	1.030

Source: Research Data (2023)

From table 4.1 above, KPLC is credited by International organization for standardization (ISO) (M=4.06, SD=0.967). Implementation of control measures to track performance (M=4.05, SD=1.006) and the systems that ensure failure mode analysis is achieved (M=4.01, SD=1.116). All these were adopted to a large extent.

4.3 Lean Management

Table Error! No text of specified style in document.:2 Lean Management

	Mean	Std. Deviation
There are standard operating procedure that ensures standardization of all work processes.	4.07	.899
All wastes in the company processes is eliminated such as, (Contracts of clients not willing to pay for services are terminated with immediate effect)	3.80	1.119
Overall Score	3.94	1.009

Source: Research Data (2023)

With regard to Lean Management, respondents strongly indicated that there are standard operating procedures that ensure standardization of all work processes within KPLC with a (M=4.07, SD= 0.899). Elimination of wastes in the company processes also recorded high figures (M=3.08, SD=1.119). This indicates that standard operating procedures are adopted to a large extent and elimination of wastes in the processes are moderately adopted.

4.4. Automation

With respect to automation, most respondents asserted that there are short term automation programs (M=4.13, SD=1.086). The study also indicated that operations improvements lead to cost savings (M=3.92, SD=0.997) and finally (M=3.84, SD=1.127) that operations improvement lead to efficiencies with regard to defect removal. From the table below, short-term automation programs were adopted to a large extent and defect removal structures and operations that are cost saving were adopted to a moderate extent.

Table Error! No text of specified style in document.:3 Automation

	Mean	Std. Deviation
There have been short term automation programs	4.13	1.086
Operations are cost saving	3.92	.997
There is efficiency in Defect removal	3.84	1.127
Overall Score	3.96	1.070

Source: Research Data (2023)

4.5. Six Sigma

With regard to Six-Sigma, the respondents asserted that work processes are organized to meet the arrival rate of work and that duration of work processes such as training is predetermined to avoid delays in deployments (M= 4.14, SD=1.123). They also agreed that all Projects and business operations have a well-defined scope at KPLC (M=4.09, SD=0.913). Furthermore, they asserted that Business operations are regularly reviewed and analyzed (M=4.13, SD=0.897). All the parameters of six-sigma were adopted largely.

Table Error! No text of specified style in document.:4 Six Sigma

	Mean	Std. Deviation
Work processes are organized to meet the arrival rate of work. Duration of work processes such as training is predetermined to avoid delays in deployments.	4.14	1.123
All Projects and business operations have a well-defined scope.	4.09	.913
Business operations are regularly reviewed and analyzed.	4.13	.897
Overall Score	4.12	.978

Source: Research Data (2023)

4.6. Kaizen

Table Error! No text of specified style in document.:5 Kaizen

	Mean	Std. Deviation
The company trains employees to ensure that there is performance improvement	4.14	.966
Innovations, creativity and challenging mentality are encouraged in process improvement.	4.01	.970
Team member's opinions and ideas are considered in problem solving sessions.	4.07	.987
Overall Score	4.07	.974

Source: Research Data (2023)

Table 4.5 shows that training employees aims at enhancing performance (M=4.14, SD=0.966) and the firm encouragement on innovations and creativity improve processes (M=4.01, SD=0.97) Teamwork in problem solving sessions is important (M=4.07, SD=0.987). All the constructs are largely adopted as shown by their mean.

4.7 Ranking of Operations Improvement Approaches

Table Error! No text of specified style in document.:6 Ranking of Operations Improvement Approaches

	Mean	Std. Deviation	Ranking
Six Sigma	4.12	0.978	1
Kaizen	4.07	0.974	2
Total Quality Management	4.04	1.030	3
Automation	3.96	1.070	4
Lean Management	3.94	1.009	5

Source: Research Data (2023)

4.8. The Relationship between Operations Improvement Approaches and Customer Satisfaction

The second objective of the study was to determine the effect of operations improvement approaches on customer satisfaction. Regression analysis was carried out to determine the relationship between operations improvement approaches variables and customer satisfaction variables.

The regression model is: $CS = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon$

Where; β_0 is the regression constant or intercept, $\beta_1, \beta_2, \beta_3,$ and β_4 and β_5 are the unknown parameters attached to the five independent variables (regression coefficients), CS= Customer Satisfaction, B_0 =Constant, X_1 =Total Quality Management, X_2 =Lean Management, X_3 =Automation X_4 =Six Sigma, X_5 =Kaizen ϵ = Standard error.

4.9. Operation improvement approaches and Response Time

Table Error! No text of specified style in document.:7 Regression Coefficients of Response Time

Coefficients ^a											
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.191	.390		.882	.000					
	TQM	.607	.063	.369	.590	.000	.478	.495	.353	.917	1.091
	Lean Management	.471	.063	.314	.420	.000	.565	.403	.273	.758	1.319
	Automation	.219	.068	.138	.221	.000	.203	.188	.119	.738	1.355
	Six Sigma	.360	.055	.269	.584	.000	.449	.364	.243	.811	1.233
	Kaizen	.454	.059	.337	.729	.000	.498	.417	.285	.712	1.404

a. Dependent Variable: Response time

Source: Research Data (2023)

The regression equation when response time is the dependent variable: $RT = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon$

$$RT = 2.191 + 0.607X_1 + 0.471X_2 + 0.291X_3 + 0.360X_4 + 0.454X_5$$

From table 4.7, T values of Total quality management (t=0.590, P<0.05), Lean management (t=0.420, P<0.05) Automation (t=0.221, P<0.05), Six Sigma (t=0.584, P<0.05) and Kaizen (t=0.729, P<0.05) do not exceed 1.96 and the P values are less than 0.05. This indicates that these operations improvement approaches have a significant influence on the response time and relationship between independent variable; total quality management, lean management, automation, six sigma and Kaizen & response time exists.

Table Error! No text of specified style in document.:8 Model Summary of Response time

Model Summary ^b									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.784 ^a	.615	.608	.93105	.615	90.544	5	290	.000

a. Predictors: (Constant)TQM, Lean Management, Automation, Six Sigma, Kaizen

b. Dependent Variable: Response time

Source: Research Data (2023)

Table above reveals the outcome of multiple regression analysis when Predictors Six Sigma, Total Quality Management, Automation, Lean Management and Kaizen are regressed against Response Time. R square = 61.5%. This shows that 61.5% of the variance in Response time is accounted for by the operations improvement approaches. 38.5 % of the variance in response time needs to be established. The results showed a strong correlation as shown by a correlation coefficient of 0.784.

Table Error! No text of specified style in document.:9 ANOVA for Response Time

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	392.440	5	78.488	90.544	.000 ^b
	Residual	246.184	284	.867		
	Total	638.624	289			
a. Dependent Variable: Response time						
b. Predictors: (Constant), TQM, Lean Management, Automation, Six Sigma, Kaizen						

Source: Research Data (2023)

The researcher carried out ANOVA analysis to ascertain the correlation between the dependent variable response time on KPLC services and the independent variables (Total Quality Management, Lean Management, Automation, Six Sigma, and Kaizen).

The outcome presented on the table above revealed that the relationship was significant at a 5% level of significance with a p-value <0.05. The F value at degree of freedom (5,284) of 90.544 was significant since it is greater than the critical value of 2.21. This is supported by the P value of 0.00, which is less than 5% indicating that the model is enough to predict the response time.

4.10. Operations improvement approaches and quality

Table Error! No text of specified style in document.:10 Regression Coefficients of Quality

Coefficients ^a											
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
		1	(Constant)	2.336			.402		.712	.000	
	TQM	.615	.065	.355	.417	.000	.475	.488	.340	.917	1.091
	Lean Management	.557	.065	.353	.512	.000	.593	.451	.308	.758	1.319
	Automation	.238	.070	.143	.388	.000	.207	.197	.122	.738	1.355
	Six Sigma	.339	.056	.241	.010	.000	.436	.336	.217	.811	1.233
	Kaizen	.490	.061	.346	.093	.000	.506	.433	.292	.712	1.404
a. Dependent Variable: Quality											

Source: Research Data (2023)

Regression analysis was done to determine the relationship between operations improvement approaches variables and quality as the dependent variable.

$$QA = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon$$

Where; β_0 is the regression constant or intercept, $\beta_1, \beta_2, \beta_3,$ and β_4 and β_5 are the unknown parameters attached to the five independent variables (regression coefficients), QA= Quality, B_0 =Constant, X_1 =Total Quality Management, X_2 =Lean Management, X_3 =Automation X_4 =Six Sigma, X_5 =Kaizen ϵ = Standard error.

$$QA = 2.336 + 0.615X_1 + 0.557X_2 + 0.238X_3 + 0.339X_4 + 0.490X_5$$

The results displayed above show that the P values of the five operations improvement approaches is 0.000 which is less than 5 %. Based on these figures, Total quality management, lean management, automation, six sigma and kaizen have a significant relationship with quality influence on the quality of service at Kenya Power and Lighting Company.

Table Error! No text of specified style in document.:11 Model Summary of quality

Model Summary ^b									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.793 ^a	.629	.623	.95994	.629	96.414	5	290	.000
a. Predictors: (Constant), TQM, Lean Management, Automation, Six Sigma, Kaizen									
b. Dependent Variable: Quality									

Source: Research Data (2023)

The above tabulation reveals R square of 62.9%. This means that 62.9% of the variance in quality is reported by operations improvement approaches in the adopted model. 38.1% is as a result of pure chance factors and other variables not incorporated in the model.

Table Error! No text of specified style in document.:12 ANOVA for Quality

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	444.217	5	88.843	96.414	.000 ^b
	Residual	261.700	284	.921		
	Total	705.917	289			
a. Dependent Variable: Quality						
b. Predictors: (Constant), SixSigma, TQM, Automation, LeanManagement, Kaizan						

Source: Research Data (2023)

The outcome presented in table above revealed that the relationship was significant at a 5% level of significance with a p-value <0.05. The F value at degree of freedom (5,284) of 96.414 was significant since it is greater than the critical value of 2.21. The P value of 0.00, is less than 5% indicating that the model is enough to predict the quality.

4.11. Operations improvement approaches and Reliability

Table Error! No text of specified style in document.:13 Regression Coefficients of Reliability

Coefficients ^a											
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.348	.398		.230	.000					
	TQM	.633	.065	.363	.777	.000	.486	.502	.348	.915	1.093
	LeanManagement	.569	.065	.359	.766	.000	.602	.461	.312	.754	1.326
	Automation	.234	.070	.140	.369	.000	.211	.196	.120	.736	1.358
	SixSigma	.335	.056	.236	.983	.000	.434	.335	.213	.810	1.235
	Kaizan	.488	.060	.343	.126	.000	.509	.434	.289	.709	1.411
a. Dependent Variable: Reliability											

Source: Research Data (2023)

Data was regression to determine the relationship between operations improvement approaches variables and customer satisfaction variable reliability.

The regression model is: $RL = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon$

Where; β_0 is the regression constant or intercept, $\beta_1, \beta_2, \beta_3,$ and β_4 and β_5 are the unknown parameters attached to the five independent variables (regression coefficients), RL = Reliability, B_0 =Constant, X_1 =Total Quality Management, X_2 =Lean Management, X_3 =Automation X_4 =Six Sigma, X_5 =Kaizen ϵ = Standard error. $RL = 2.348 + 0.633X_1 + 0.569X_2 + 0.234X_3 + 0.335X_4 + 0.488X_5$

The results displayed above show that the t values of the five operations improvement approaches adopted are less than 1.96. On the other hand, P value gives 0.000 which is less than 5 %. Based on the outcome of p value, Total quality management, lean management, automation, six sigma and kaizen have a significant relationship with reliability and the approaches significantly influence on the quality of service at Kenya Power and Lighting Company.

Table Error! No text of specified style in document.:14 Model Summary of reliability

Model Summary ^b									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.800 ^a	.641	.634	.95102	.641	101.315	5	290	.000
a. Predictors: (Constant), TQM, LeanManagement, Automation, SixSigma, Kaizen									
b. Dependent Variable: Reliability									

Source: Research Data (2023)

Table above reveals the outcome of multiple regression analysis when Predictors Six Sigma, Total Quality Management, Automation, Lean Management and Kaizen are regressed against Reliability. The coefficient to determination is .641 which means that 64.1% of the variance in Response time is explained by the independent variables. This suggest that there are some other factors that account for 33.9% of the variance in Customer Satisfaction Construct Reliability of service at KPLC which needs to be subjected to further research. Furthermore, there is a strong correlation as shown by a correlation coefficient of 0.800.

Table Error! No text of specified style in document.:15 ANOVA for Reliability

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	458.162	5	91.632	101.315	.000 ^b
	Residual	256.859	284	.904		
	Total	715.021	289			
a. Dependent Variable: Reliability						
b. Predictors: (Constant), TQM, LeanManagement, Automation, SixSigma, Kaizen						

Source: Research Data (2023)

The researcher carried out ANOVA analysis to ascertain the correlation between the dependent Variable Reliability of KPLC services and the independent variables (Six Sigma, Total Quality Management, Automation, Lean Management and Kaizen). The outcome presented in the table above reveals that the relationship is significant at a 5% level of significance with a p-value <0.05.

4.12. Operations improvement approaches and cost

Table Error! No text of specified style in document.:16 Regression Coefficients of Cost

Coefficients ^a											
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
		1	(Constant)	2.418			.387		.964	.000	
	TQM	.650	.063	.375	.310	.000	.497	.522	.359	.915	1.093
	LeanManagement	.567	.063	.360	.985	.000	.605	.470	.313	.754	1.326
	Automation	.262	.068	.157	.859	.000	.196	.223	.134	.736	1.358
	SixSigma	.365	.054	.259	.692	.000	.448	.369	.233	.810	1.235
	Kaizen	.471	.058	.333	.049	.000	.499	-.431	.280	.709	1.411
a. Dependent Variable: Cost											

Source: Research Data (2023)

Regression analysis was carried out to determine the relationship between operations improvement approaches variables and customer satisfaction variable cost.

The regression model is: $CO = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon$

Where; β_0 is the regression constant or intercept, $\beta_1, \beta_2, \beta_3,$ and β_4 and β_5 are the unknown parameters attached to the five independent variables (regression coefficients), $CO =$ Cost, $B_0 =$ Constant, $X_1 =$ Total Quality Management, $X_2 =$ Lean Management, $X_3 =$ Automation $X_4 =$ Six Sigma, $X_5 =$ Kaizen $\epsilon =$ Standard error. The Equation $CO = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5$ Then becomes $CO = 2.418 + 0.650X_1 + 0.567X_2 + 0.262X_3 + 0.365X_4 + 0.471X_5$

From table 5.41, T values of Total quality management ($t=0.310, P<0.05$), Lean management ($t=0.985, P<0.05$) Automation ($t=0.859, P<0.05$), Six Sigma ($t=0.692, P<0.05$) and Kaizen ($t=0.049, P<0.05$) do not exceed 1.96. However; their P values are less than 0.05. This indicates that these operations improvement approaches have a significant influence on cost and relationship between total quality management, lean management, automation, six sigma and Kaizen and the dependent variable cost exists.

Table Error! No text of specified style in document.:17 Model Summary of cost

Model Summary ^b									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.810 ^a	.656	.650	.92602	.656	108.273	5	290	.000
a. Predictors: (Constant), TQM, LeanManagement, Automation, SixSigma, Kaizen									
b. Dependent Variable: Cost									

Source: Research Data (2023)

Table above reveals the outcome of multiple regression analysis when Predictors Six Sigma, Total Quality Management, Automation, Lean Management and Kaizen are regressed against Cost of services. The coefficient to determination is .656 meaning that 65.6% of the variance in quality of service is explained by the independent variables. This suggest that there are some other factors that account for 34.4% of the variance in Customer Satisfaction Construct Cost of service at KPLC which needs to be subjected to further research. Furthermore, there is a strong correlation as shown by a correlation coefficient of 0.810.

Table Error! No text of specified style in document.:18 ANOVA for Cost

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	464.224	5	92.845	108.273	.000 ^b
	Residual	243.531	284	.858		
	Total	707.755	289			
a. Dependent Variable: Cost						
b. Predictors: (Constant), SixSigma, TQM, Automation, LeanManagement, Kaizen						

Source: Research Data (2023)

The researcher carried out ANOVA analysis to ascertain the correlation between Cost of KPLC services as dependent variable and the independent variables (Six Sigma, Total Quality Management, Automation, Lean Management and Kaizen). The outcome presented in the table above reveals that the relationship is significant at a 5% level of significance with a p-value <0.05.

Therefore, the model adopted is sufficient for predicting cost effectiveness at Kenya Power and Lighting Company.

4.13. Operation improvement approaches and flexibility

Regression analysis was carried out to determine the relationship between operations improvement approaches variables and flexibility as a dependent variable of customer satisfaction.

Table Error! No text of specified style in document.:19 Regression Coefficients of Flexibility

Coefficients ^a											
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.577	.378		.999	.000					
	TQM	.658	.061	.380	.777	.000	.497	.539	.365	.924	1.083
	LeanManagement	.574	.060	.369	.638	.000	.605	.496	.327	.782	1.278
	Automation	.266	.066	.159	.043	.000	.196	.233	.137	.738	1.355
	SixSigma	.388	.052	.279	.492	.000	.454	.406	.254	.827	1.210
	Kaizen	.471	.057	.333	.315	.000	.499	.442	.282	.714	1.400

a. Dependent Variable: Flexibility

Source: Research Data (2023)

The regression model is: $FL = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \varepsilon$

Where; β_0 is the regression constant or intercept, $\beta_1, \beta_2, \beta_3,$ and β_4 and β_5 are the unknown parameters attached to the five independent variables (regression coefficients), FL= Flexibility, B_0 =Constant, X_1 =Total Quality Management, X_2 =Lean Management, X_3 =Automation X_4 =Six Sigma, X_5 =Kaizen ε = Standard error. The Equation $FL = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5$ Then becomes $FL = 2.577 + 0.658X_1 + 0.574X_2 + 0.266X_3 + 0.388X_4 + 0.471X_5$

From the table above, t values for all the adopted operations improvement approaches are lower than 1.96. This is collaborated with P values, which do not exceed 5%. This indicates that these operations improvement approaches have influence on the flexibility of services at Kenya Power and Lighting Company

Table Error! No text of specified style in document.:20 Model Summary of Flexibility

Model Summary ^b									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.821 ^a	.674	.668	.90139	.674	117.414	5	284	.000

a. Predictors: (Constant), TQM, LeanManagement, Automation, SixSigma, Kaizen
 b. Dependent Variable: Flexibility

Source: Research Data (2023)

Table above reveals the outcome of multiple regression analysis when Predictors Six Sigma, Total Quality Management, Automation, Lean Management and Kaizen are regressed against Reliability. R square =67.4% which shows that the 67.4% variance in Flexibility is explained by the independent variables studied. This suggest that there are some other factors that account for 32.6% suggests that there are other factors that contribute to flexibility at of the power utility firm. Furthermore, there is a strong correlation as shown by a correlation coefficient of 0.821.

Table Error! No text of specified style in document.:21 ANOVA for Flexibility

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	477.002	5	95.400	117.414	.000 ^b
	Residual	230.753	284	.813		
	Total	707.755	289			

a. Dependent Variable: Flexibility
 b. Predictors: (Constant), SixSigma, TQM, Automation, LeanManagement, Kaizen

Source: Research Data (2023)

The outcome presented in table above reveals that the relationship is significant at a 5% level of significance with a p-value <0.05. Above table shows that calculated F value at degree freedom of 5, 284 of 117.414 was significant as it is greater than critical value of 2.21. This affirms that the model is sufficient for predicting flexibility of services at Kenya Power and Lighting Company.

4.14. Operations Improvement Approaches and Customer Satisfaction

In addition to the analysis carried out on individual indicators of customer satisfaction, a composite measure of customer satisfaction has been carried. This was aimed at establishing the effect of operations improvement approaches on customer satisfaction.

The regression model is: $CS = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon$

Where; β_0 is the regression constant or intercept, $\beta_1, \beta_2, \beta_3,$ and β_4 and β_5 are the unknown parameters attached to the five independent variables (regression coefficients), CS= Customer Satisfaction, B_0 =Constant, X_1 =Total Quality Management, X_2 =Lean Management, X_3 =Automation X_4 =Six Sigma, X_5 =Kaizen ϵ = Standard error. The Equation $CS = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5$ Then becomes $CS = 1.187 + 0.144X_1 + 0.146X_2 + 0.111X_3 + 0.131X_4 + 0.158X_5$

Based on the Regression equation established by factoring in all the five operation improvement approaches constant zero, customer satisfaction will be 1.187.

Table Error! No text of specified style in document.:22 Regression Coefficients of Customer Satisfaction

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.187	.288		4.126	.000
	Total Quality Management	.144	.056	.151	2.568	.000
	Lean Management	.146	.056	.148	2.583	.000
	Automation	.111	.048	.135	2.333	.000
	Six Sigma	.131	.051	.145	2.589	.000
	Kaizen	.158	.056	.163	2.839	.000

a Dependent Variable: Customer Satisfaction

Source: Research Data (2023)

From the table above, t values for operations improvement approaches (Total Quality Management (t=2.568, P<5%), Lean Management (t=2.583, P<5%), Automation (t=2.333, P<5%), Six sigma (t=2.589, P<5%) and Kaizen (t=2.663, P<5%) are all above 1.96. This indicates that the independent variables have a relationship and influence on customer satisfaction. P values are all less than 5% indicating that there is influence on customer satisfaction. Customer satisfaction becomes 1.187 when all the other variables are at zero.

4.15 Model Summary of Customer Satisfaction

Table Error! No text of specified style in document.:23 Model Summary of Customer Satisfaction

Model Summary ^b									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.821 ^a	.674	.668	.90139	.674	117.414	5	290	.000

a. Predictors: (Constant), TQM, LeanManagement, Automation, SixSigma, Kaizen

b. Dependent Variable: Customer Satisfaction

Source: Research Data (2023)

The table above gives R square of 67.4%. This demonstrates that 67.4% of variation in customer satisfaction is because of implementation of operations improvement approaches. 32.6% of the variation is not accounted for and it can be subjected for further research.

Table Error! No text of specified style in document.:24 ANOVA for Composite Customer Satisfaction

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	85.904	5	17.181	17.755	.000 ^b
	Residual	274.816	284	.968		
	Total	360.721	289			
a. Dependent Variable: Customer Satisfaction						
b. Predictors: (Constant), TQM Lean Management, Automation, Six Sigma, Kaizen						

Source: Research Data (2023).

At 5% significance level, the table above gives a calculated F value at degree of freedom of (5,284) of 17.755. This is greater than the critical value of 2.21. The P value of 0.000 is also less than 5% thus the model is sufficient to predict customer satisfaction in Kenya Power and Lighting Company.

5. DISCUSSION

The study was guided by two objectives and the study achieved both. On objective one, which was to find out the extent of implementation of operations improvement approaches at Kenya Power & Lighting Company (KPLC). It was determined that Total Quality Management, Kaizen and Six Sigma had been adopted to a large extent. Automation and Lean Management on the other hand were moderately adopted by KPLC. Respondents were in agreement with approval levels of between 3.94 and 4.12 on their adoption. This signifies that the first objective was realized. These findings are supported by the ontological assumption of the systems theory given that operational improvement objectives are a source of processes that lead to specific outputs in this case better customer service. Furthermore, the study revealed a number of insights. First, despite the efforts being undertaken by KPLC to improve their operations, there is still some problems with communication, for instance, on all the five constructs of operation improvement approaches, the means ranged between 3.94 and 4.12 which left out some gap of respondents who were not certain. On a construct such as tracking performance, there was a gap of 0.95 of respondents who could not explicitly indicate whether there were control measures were in place to track performance and to identify when processes are out of control. This suggests that information is not being disseminated appropriately to the company's stakeholders.

The second objective was to determine the effect of these operations improvement approaches on customer satisfaction at KPLC. The study revealed that the five operational improvement constructs (Total Quality Management, Automation, Lean Management, Kaizen & Six-Sigma) positively influence customer satisfaction based on the results of F-tests which rejected all the null hypothesis. The findings therefore supported the validity of the adopted conceptual framework which indicates that the five operations improvement approaches have some effect on customer satisfaction. This is supported by the Consumer theory given that high levels of customer satisfaction are a consequence of fulfilment of expectations. Where KPLC have implemented deliberate operational objectives targeted at improving the levels of customer satisfaction, it is clear that the strategies have a positive effect. These findings are in agreement with the findings of Kibe (2014) which revealed a positive relationship between Total Quality Management, Lean Management, Automation, Kaizen and Six Sigma and customer satisfaction in the private security companies in Nairobi. Six sigma was firstly ranked as per its adoption level since it was largely adopted with the Mean of 4.12 and Standard Deviation of 0.978. The results agree with (Team, 2023) that asserted that an organization's process performance, defect rate, and budget can benefit greatly from adopting Six Sigma principles and using these tools and procedures. Secondly ranked by the respondents was Kaizen which was largely adopted as evidenced by the general score of mean of 4.07 and deviation of 0.9734.

6. CONCLUSION

The aim of this study was to find out the extent of implementation of operations improvement approaches at Kenya Power & Lighting Company and determine the effect of these operations improvement approaches on customer satisfaction at KPLC. The researcher drew a number of conclusions from the study. The study revealed that KPLC has done fairly well to implement operation improvement approaches with responses asserting approval rates of means between 3.8 and 4.14 out of a Linkert scale that had options from 1 to 5. Nevertheless, the study also revealed gaps in KPLC implementations surrounding communication and cascading down policies from management down to employees, where some respondents gave neutral responses on aspects that others overwhelmingly agreed to be in place. The study also revealed some

concerns with regard to reliability of KPLC services. Poor accessibility of the infrastructure, weather conditions or resource challenges might have led to unreliable power services. This was also similar to response time where a small segment of the respondents indicated poor response times, this is expected given the size of the company KPLC but it still needs to do more to improve response times. With regard to the study objective of assessing the influence of operation improvement approaches to customer satisfaction at Kenya Power and Lighting Company, the study concluded that the five constructs Total Quality Management, Lean Management, Automation, Kaizen and Six Sigma significantly influence customer satisfaction constructs Reliability, Cost, Flexibility, Reliability and Response time.

7. RECOMMENDATIONS

According to the results, the study recommends that Kenya Power and Lighting Company should adopt operations improvement approaches. These approaches have a positive and significant influence on customer satisfaction. It is clear that KPLC needs to do more at communicating both internally and to its customers. There was a significant percentage who posted neutral responses on Automation, Total Quality Management, Lean Management, Kaizen and Six-Sigma despite majority agreeing, this indicates that these respondents are not aware of the existence of these operational improvement approaches. The utility firm should largely adopt lean management and automation since they were adopted moderately. KPLC should also undertake more initiatives to improve services to its customers. For some of the customers to suggest that the company is not capable of adjusting capacity in provision of services depending on demand, should be a worrying concern. Concerns of those who asserted that customer requirements are not met in terms of variety products, customization and volume should also be addressed in order for KPLC to improve its image as well as meet the expectations of its customers.

There were also a significant number of customers who believed that KPLC services are not reliable and that their concerns were not being addressed on time. Such challenges will mostly exist under the environment that the company works in for instance given that they rely majorly on road infrastructure to deliver its services. However, the company must do more to explain and show the customer that they actually care and explain these challenges to them. Within its strategic plan, the company's top management should focus on improving its customer levels to ensure that this change is actually being felt by customers.

8. RESEARCH CONTRIBUTION

This study will aid researchers and management experts in optimizing operations within various industries with a goal of reaping maximum benefits. Contributions of this study are significant for enhancing the efficiency, effectiveness and competitiveness of organizations. The findings of this study are helpful to researchers in coming up with new methodologies, best practices, and insights that can be applied to various industries, which could lead to reduced costs, improved quality, and faster delivery times. The findings of this study could also influence researchers into the development and refinement of lean and Six Sigma methodologies, which are widely used for process improvement and waste reduction especially in service industries. Findings could also inform improvement in methodologies for quality control, defect prevention and root cause analysis. This research will help organizations maintain high-quality standards.

The findings around Total Quality Management will contribute to the development of frameworks and principles for achieving a culture of continuous improvement, customer focus, and employee involvement within organizations. Most importantly, the findings of this study will help in enhancing customer experience, and optimizing service delivery processes in sectors like healthcare, finance, and transportation. Managers could also utilize the findings to extend to sustainable operations by developing strategies for reducing waste, conserving resources and minimizing environmental impact.

9. LIMITATIONS OF THE STUDY

The study was limited as it relied on only primary data, which was obtained by use of a structured questionnaire. Even though the respondents were assured of anonymity, some did not attempt to answer the questions at all. In addition, the study was limited by the objectives, which focused on five key operational improvement approaches leaving other variables. The study was also constrained by the fact that focus was on one county with different levels of power connectivity, economic levels as well as service levels. This may make it difficult to map the findings to the other 46 counties.

10. SUGGESTION FOR FURTHER STUDIES

Further study should be carried out on a different context since the unit of study was solely Kenya Power and Lighting Company Busia county branch. The results of regression analysis showed that there were probably other factors that influence customer satisfaction. Therefore, studies should be conducted to ascertain it. Future scholars should carry out a research of the impact of operations improvement approaches on customer satisfaction in all parastatals, multinational organizations or manufacturing companies in Kenya.

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